CVT

Chosen Valley Testing

Design Phase Geotechnical Report:

Proposed Schumann Business Park Development
Schumann Drive NW
Stewartville, Minnesota

Prepared for:

City of Stewartville
c/o Mr. David Strauss, PE
Yaggy Colby Associates

January 31, 2012
MNR12.3900

1410 7th Street NW
Rochester MN 55901
507-281-0968

135 Buchner Place
La Crosse, WI 54603
608-782-5505

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Rice, MN 56367
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507-389-9180

225 N Jackson Ave.
Mason City, IA 50401
641-201-1050

460 E 18th St.
Dubuque, IA 52001
563-556-0014

City of Stewartville
c/o David Strauss, PE
Yaggy Colby Associates
717 Third Avenue SE
Rochester, MN 55904
dstrauss@yaggy.com

January 31, 2012

Re: Design Phase Geotechnical Evaluation
Proposed Schumann Business Park Development
Schumann Drive NW
Stewartville, Minnesota
CVT Project Number: MNR12.3900

Dear Mr. Strauss,

As authorized, we have completed the geotechnical evaluation for the proposed business park development in Stewartville, Minnesota. This letter briefly summarizes the findings in the attached report.

<u>Summary of Boring Results</u>

At the surface, the borings encountered about 1 to 4 feet of topsoil.

Beneath the topsoil, the borings were dominated by sandy clay glacial till. The eastern most boring encountered a layer of silty sand just below the topsoil to about 4 feet before transitioning to sandy clay till. Two of the borings encountered a layer of silty sand within the sandy clay till, and one of those terminated in the silty sand. The other borings all terminated in glacial sandy clay at depths of 11 to 36 feet below the surface.

During drilling, water was observed in two borings at depths of about 15 feet and 12½ feet. We suspect that the moisture observed is trapped within isolated pockets of higher permeable soil within the low permeability glacial clays. Samples from these two borings contained seams of silt and sand.

<u>Summary of Analysis and Recommendations</u>

Based on the findings, limited areas of perched water are expected to be encountered during construction. Because the dominant soils are clays, sump pumps are expected to be capable of removing any water that may be encountered in the excavations. With the present information, extensive pumping or dewatering is not expected to be needed.

Utilities are expected to bear primarily on sandy clays, with some bearing on silty sands These soils are expected to be generally suitable for support of utilities.

The soils available as fill are expected to consist of sandy clays and silty sands. Most of these materials appear to be suitable for reuse and fill above the pipes. Some of the materials were very dense and dry, there will be a greater potential for subgrade settlement (despite good compaction and good test roll results) where these soils are used as fill. Because these materials were generally toward the bottom of the borings, the risk of this situation appears to be rather small – but should be should be evaluated during construction.

The subgrade soils are expected to consist primarily of sandy lean clays and silty sands. We recommend using a value of 12 for design on these materials. If 12 inches of select granular is placed below the pavement materials, the effective R-value would increase to about 20.

Remarks

We appreciate the opportunity to serve you. If you have any questions about our report, please feel free to contact us in our Rochester office at (507) 281-0968.

Sincerely,
Chosen Valley Testing, Inc.

Devin Ehler
Geotechnical Engineer

Colby T. Verdegan, PE
Sr. Geotechnical/Materials Engineer

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Design Phase Geotechnical Evaluation
Proposed Schumann Business Park Development
Schumann Drive NW
Stewartville, Minnesota

CVT Project Number: MNR12.3900
Date: January 31, 2012

A. Introduction

The intent of this report is to present our results to the client in the same logical sequence that led us to arrive at the opinions and recommendations expressed. Since our services must often be completed before the design, assumptions are sometimes needed to prepare a proper evaluation and to analyze the data. A complete and thorough review of this entire document, including the assumptions and the appendices, should be undertaken immediately upon receipt.

A.1. Purpose

This geotechnical evaluation was prepared to assist the design for the proposed business park development in Stewartville, Minnesota. Our services were authorized by Mr. David Strauss, PE of Yaggy Colby Associates on behalf of the City of Stewartville.

A.2. Scope

To obtain data for analysis, we were authorized to perform a total of 9 penetration test borings in the proposed development. The borings were drilled to depths ranging from about 10 to 35 feet. Our engineering scope consisted of providing factual geotechnical findings and recommendations for the pavements.

A.3. Boring Locations and Elevations

The boring locations were staked by Yaggy Colby Associates and were offset by Chosen Valley Testing if access issues, such as utilities or overhead clearance, were encountered. The Boring Location Sketch in the Appendix shows the boring locations as drilled. Ground surface elevations at the borings were provided by Yaggy Colby Associates.

A.4. Geologic Background

A geotechnical report is based on subsurface data collected for the specific structure or problem. Available geologic data from the region can help interpretation of the data and is briefly summarized in this section.

Geologic maps indicate that the dominant soils in the area are glacial tills consisting of a mixture of sand, silt, and clay. Bedrock is commonly on the order of 50 to 100 feet below the surface and generally consists of limestone and dolomite of the Stewartville Formation or Prosser Limestone Formation.

B. Subsurface Data

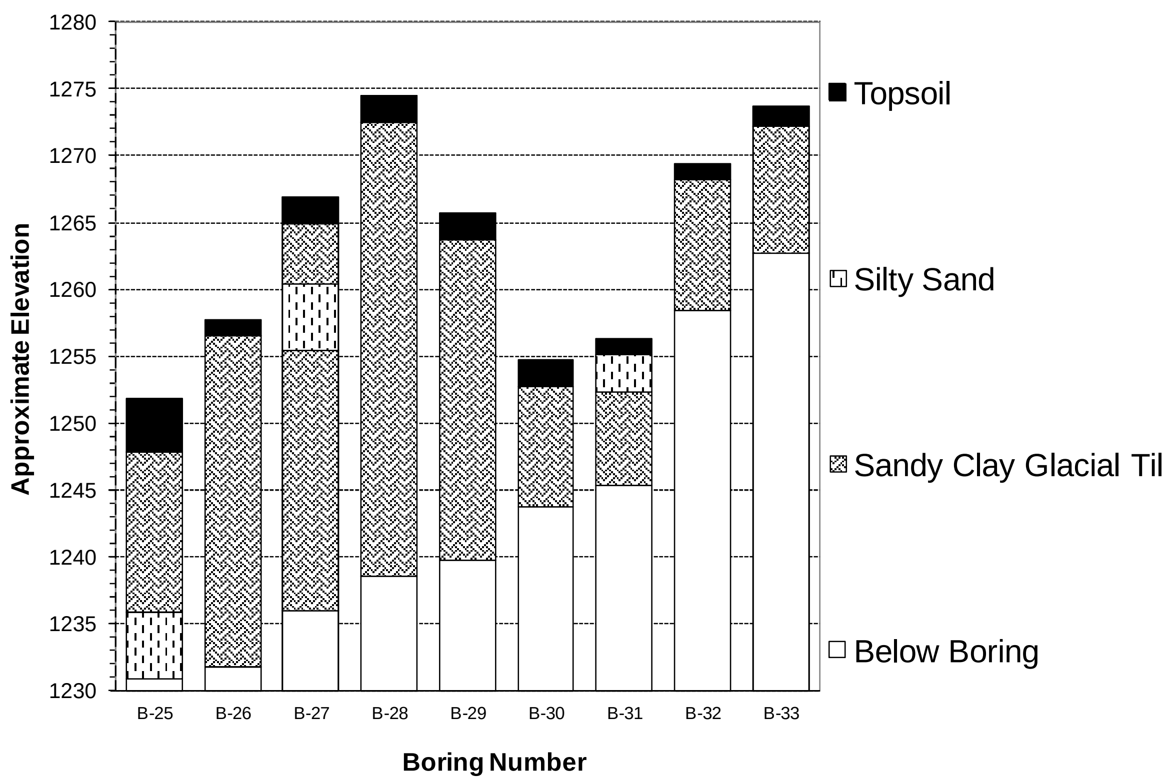
Methods: The borings were performed using penetration test procedures (Method of Test D1586 of the American Society for Testing and Materials). This procedure allows for the extraction of intact soil specimen from deep in the ground. With this method, a hollow-stem auger is drilled to the desired sampling depth. A 2-inch OD sampling tube is then screwed onto the end of a sampling rod, inserted through the hole in the auger's tip, and then driven into the soil with a 140-pound hammer dropped repeatedly from a height of 30 inches above the sampling rod. The sampler is driven 18 inches into the soil, unless the material is too hard. The samples are generally taken at 2½, 5 and 10-foot intervals. The core of soil obtained is classified and logged by the driller and a representative portion is then sealed and delivered to the soils engineer for review.

B.1. Stratification

At the surface, the borings encountered about 1 to 4 feet of topsoil.

Beneath the topsoil, the borings were dominated by sandy clay glacial till. The eastern most boring (B-31) encountered a layer of silty sand just below the topsoil to about 4 feet before transitioning to sandy clay till. Two of the borings encountered a layer of silty sand within the sandy clay till, and one of those terminated in the silty sand. The other borings all terminated in glacial sandy clay at depths of 11 to 36 feet below the surface.

The generalized stratification met in the borings is summarized in the cross section presented below. The data in the cross-section has been summarized for the reader’s convenience. For more detailed information, please refer to the Log of Boring sheets in the Appendix.



B.2. Penetration Test Results

The number of blows needed for the hammer to advance the penetration test sampler is an indicator of soil characteristics. The number of blows to advance the sampler 1 foot is called the penetration resistance or "N"-value. The results tend to be more meaningful for natural mineral soils, than for fill soils. In fill soils, compaction tests are more meaningful.

A penetration resistance value (N-value) of 11 blows per foot (BPF) was returned in the deeper topsoil. Values in the silty sand ranged from 11 to 44 BPF, indicating they were medium dense to dense. The sandy clay glacial till returned values of 4 to 61 BPF. The upper 6 ½ feet was generally considered medium to rather stiff while the deeper materials were generally stiff to hard.

A key to descriptors used to qualify the relative density of soil (such as *soft, stiff, loose,* and *dense*) can be found on the Legend to Soil Description in the Appendix.

A pocket penetrometer was used to estimate the compressive strength of the cohesive soils. The results are included on the Log of Boring sheets in the Appendix. The sandy clay glacial till returned values ranging from about 1 to greater than 4½ tons per square foot (tsf).

B.3. Groundwater Data

During the drilling operation, the drillers may note the presence of moisture on the sampling instrument, in the cuttings, or within the borehole. These observations are recorded on the boring logs. The water level may vary with weather, time of year and other factors and the presence or absence of water during the drilling is subject to interpretation and is not always conclusive.

During drilling, water was observed around 15 feet in Boring B-27 and 12½ feet in Boring B-29. We suspect that the moisture observed is trapped within isolated pockets of higher permeable soil within the low permeability glacial clays. Samples from these two borings contained seams of silt and sand.

C. Project Design Data

Each structure has a different loading configuration and intensity, different grades, and different structural and performance tolerances. Therefore, the geotechnical exploration will be construed differently from one structure to another. If the initial structure should change design, we should be engaged to review these conditions with respect to the prevailing soil conditions. Without the opportunity to review any such changes, the recommendations may no longer be valid or appropriate.

The proposed project consists of developing the Schumann Business Park in NW Stewartville. We assume utilities will be installed and bear at depths of about 5 to 12 feet below the surface. The final grades are assumed to be at or near the existing grades. Traffic loading information was not provided. We have assumed that the roadway use would consist of mostly automotive and truck traffic.

D. Utilities

D.1. Dewatering

Based on the findings, limited areas of perched water are expected to be encountered during construction. Because the dominant soils are clays, sump pumps are expected to be capable of removing any water that may be encountered in the excavations. With the present information, extensive pumping or dewatering is not expected to be needed.

D.2. Trench Sidewalls

The contractor will be required to slope or shore the excavations as needed to meet OSHA requirements for safety. The sand layers and any overly wet and soft silts or clays will likely classify as Type C soils as defined by OSHA. The stiffer clays may classify as Type B soils. The use of trench boxes or other stabilization methods should be used in deep excavations where sideslopes must be limited to protect adjoining properties.

D.3. Trench Bottom Stability

Utilities are expected to bear primarily on sandy clays, with some bearing on silty sands These soils are expected to be generally suitable for support of utilities.

Areas of soft or saturated soils may be encountered and may not permit vehicle or foot traffic. In the event that unstable soils are encountered at invert elevation, a bedding of coarse sand or gravel is recommended in the base of the utility trenches, to provide a stable surface for the crew laying the pipes. With the present information, the potential this type of instability appears to be very limited.

D.4. Fill Placement and Compaction

Soils placed as backfill below paved areas should be compacted to at least 95% of their standard Proctor density (ASTM D 698). Fill within three feet of subgrade elevation should be compacted to 100%. In green areas, 90% compaction is normally adequate. Cobbles or boulders should be kept at least 4 to 8 inches away from pipes, to limit potential for point loads on the pipes.

The soils available as fill are expected to consist of sandy clays and silty sands. Most of these materials appear to be suitable for reuse and fill above the pipes. Some of the materials were very dense and dry, there will be a greater potential for subgrade settlement (despite good compaction and good test roll results) where these soils are used as fill. Because these materials were generally toward the bottom of the borings, the risk of this situation appears to be rather small – but should be should be evaluated during construction.

Regardless of the compaction criteria used, the soils in the upper part of the subgrade should be dried and re-compacted as needed to pass a test roll. If weather or other factors do not allow this, alternate pavement designs should be used – such as adding a geosynthetic and extra breaker run to the pavement section.

E. Paved Areas

E.1. Stripping and Grading

We recommend that the topsoil be removed before any pavement sections are placed. Topsoil was about 1 to 4 feet deep at the locations explored.

After grading, the near-surface soils are expected to be dominated by sandy clays and silty sands. We recommend scarifying and compacting any near-surface soils that have not been disturbed by the utility construction in order to even out any localized discontinuities in the subgrade soils and provide a more gradational transition between materials. This action is intended to limit differential frost heave. Any areas not thoroughly mixed or treated by that process should be deeply scarified, dried, and compacted. The supervision of "ordinary compaction" and a test roll may be more representative of compaction levels than density tests.

E.2. Pavement Design

The subgrade soils are expected to consist primarily of sandy clays and silty sands. The effective Hveem-stabilometer R-value would likely range from about 10 to 20 for these soils. We recommend using a value of 12 for design on these materials. If 12 inches of select granular is placed below the pavement materials, the effective R-value would increase to about 20.

We were not provided traffic data for the roadway. Based on an R-value of 12, an assumed 20 year ESAL of about 180,000, and using MnDOT pavement design software, we suggest a pavement equivalent section consisting of 4 inches of bituminous and 12 inches of Class 5 aggregate base. This section should be considered preliminary, subject to review by the project civil designer and in considerations of the performance of similarly pavements in the area.

F. Construction Testing and Documentation

F.1. Excavation

The soils encountered are expected to be capable of supporting a variety of construction equipment, provided conditions are dry. Saturated clayey soils, organic soils, or water bearing sands will be sensitive to disturbance. In this situation, and for any deep excavations, a backhoe with a smooth-lipped bucket is recommended. The intention of the smooth-lipped bucket is to limit disturbance to the clays and provide a smooth surface for laying the pipes. Because of the very stiff glacial clays at depth, a rather large backhoe will likely be needed for the deepest excavations.

F.2. Compaction

Fill should be placed in lifts adjusted to the compactor being used and the material being compacted. We recommend limiting lifts to no more than 2 feet for clean sands or gravels, and no more than 1 foot for silty or clayey materials – assuming large, self-propelled or tow-behind compactors are used.

If the earthwork occurs during freezing temperatures, good winter construction practices should be used. No frozen fill should be used nor should structural filling take place on frozen ground.

F.3. Construction Phase Testing and Documentation

Ideally, the utility grading and roadway subgrade will be evaluated and documented by qualified personnel. Samples of any fill materials and/or alternative gradations of materials proposed for use should be submitted for approval before use. The City may wish to have, or may be obligated to have, tests performed regarding the other various paving components. Specification of such requirements is normally the responsibility of the City and their design consultant.

G. Level of Care

The services provided for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area, under similar budget and time constraints. This is our professional responsibility. No other warranty, expressed or implied, is made.

H. Certification

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly licensed engineer under the laws of the State of Minnesota.

Colby T. Verdegan, PE
Registration Number 018983
Sr. Geotechnical Engineer
January 31, 2012

Appendix

Boring Location Sketch

Log of Boring # 25-33

Legend to Soil Description

P:_Rochester Project Files_PRJ2011\MNR12.3900 (Stewartville Develop.) \ MNR12.3900b.docx

Boring Location Sketch

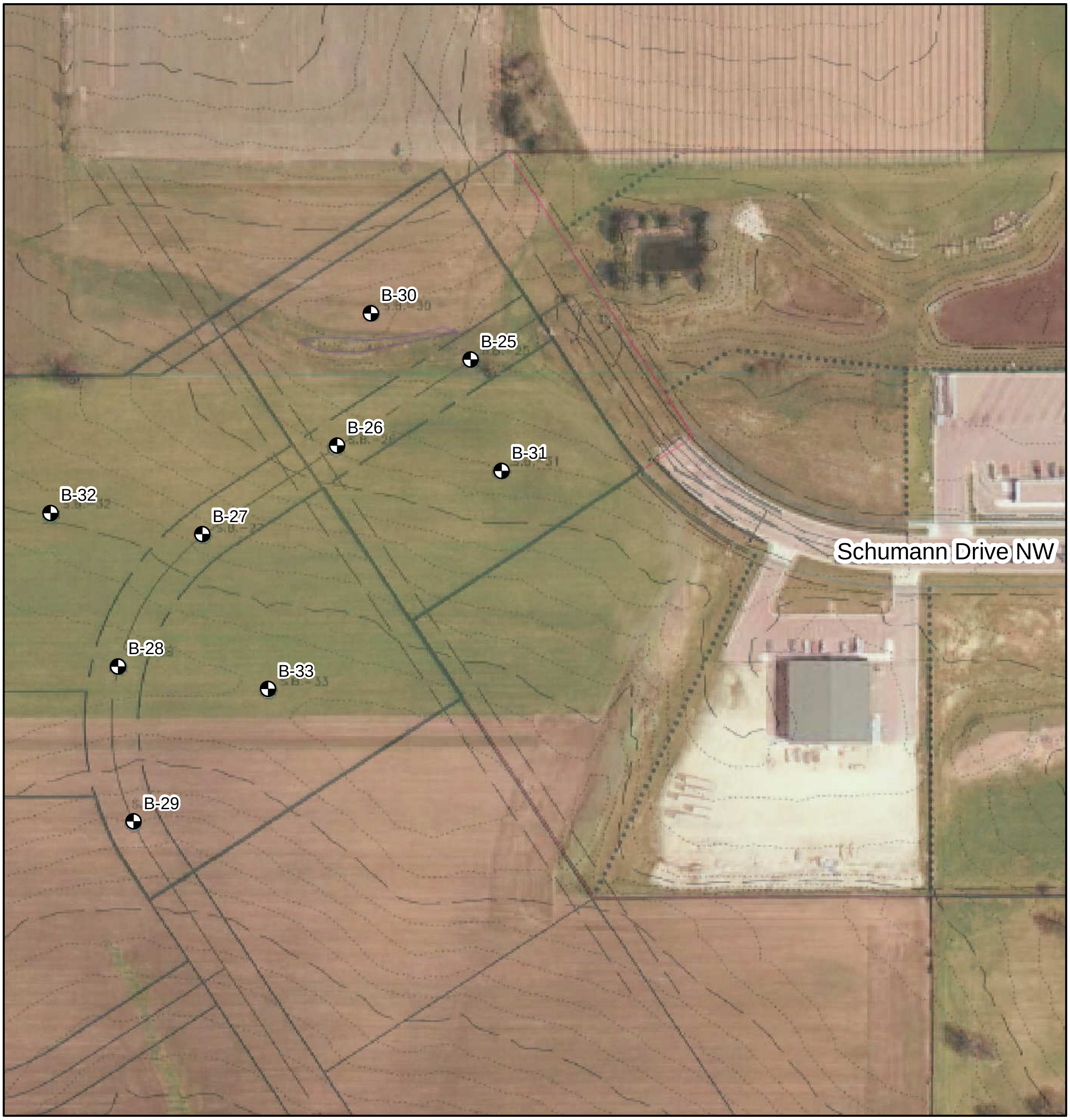
Proposed Business Park Development
Schumann Drive NW
Stewartville, MN

Chosen Valley Testing
Building on Experience

Legend

Boring Locations

0 50 100 200 300 400 500 Feet



LOG OF BORING

CHOSEN VALLEY TESTING

CVT

PROJECT:	MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: B-25 LOCATION: See attached sketch. DATE: 1/18/2012 SCALE: 1" = 5'

Elev. 1251.8	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1247.8	4.0	CL OL	**Slightly Organic LEAN CLAY** black, wet, rather stiff. (Topsoil)	11		PP = >4.5 tsf
1235.8	16.0	CL	**SANDY LEAN CLAY** grayish brown, wet to very wet, rather soft to stiff. (Glacial Till)	13		PP = 3.0 tsf MC = 23.6%
				14		PP = 2.0 tsf
				12		PP = 1.75 tsf MC = 20.8%
				7		PP = 1.5 tsf
				4		
1230.8	21.0	SM	**SILTY SAND** fine-grained, light brown to tan, moist, medium dense. (Glacial Outwash)	14		
			End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT:	MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: **B-26**
		LOCATION: See attached sketch.
		DATE: 1/18/2012 — SCALE: 1" = 5'

Elev. 1257.7	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1256.5	1.2	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
		CL	**SANDY LEAN CLAY** trace gravel, grayish brown, wet, medium to rather stiff. (Glacial Till)	6		PP = 2.5 tsf MC = 10.4%
				7		PP = 1.0 tsf MC = 18.4%
1248.7	9.0			10		PP = 2.5 tsf
		CL	**SANDY LEAN CLAY** trace gravel, brown to dark gray, wet, very stiff to hard. (Glacial Till)	23		PP = >4.5 tsf MC = 15.3%
				22		PP = >4.5 tsf
				34		PP = >4.5 tsf
				41		PP = >4.5 tsf
1231.7	26.0			47		
			End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT:	MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: **B-27**
		LOCATION: See attached sketch.
		DATE: 1/18/2012 — SCALE: 1" = 5'

Elev. 1266.9	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1264.9	2.0	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
1260.4	6.5	CL	**SANDY LEAN CLAY** grayish brown, wet, medium to rather stiff. (Glacial Till)	12		PP = >4.5 tsf
				8		PP = 2.5 tsf MC = 16.5%
1255.4	11.5	SM	**SILTY SAND** fine-grained, trace seams of clay, brown, moist, dense. (Glacial Outwash)	39		
				44		Poor sample return.
1235.9	31.0	CL	**SANDY LEAN CLAY** trace gravel, brown to dark gray, wet, very stiff to hard. (Glacial Till)	32		PP = >4.5 tsf MC = 9.5%
			Trace seams of silt and sand around 15 feet.	32	∇	PP = >4.5 tsf Water encountered around 15'
				27		
				37		PP = >4.5 tsf
				42		PP = >4.5 tsf
			End of Boring. Boring sealed upon completion.			

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT:	MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING:	B-28
		LOCATION:	See attached sketch.
		DATE: 1/18/2012	SCALE: 1" = 5'

Elev. 1274.5	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1272.5	2.0	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
1268.0	6.5	CL	**SANDY LEAN CLAY** trace gravel, grayish brown, wet, medium to rather stiff. (Glacial Till)	9		PP = 3.0 tsf
				8		PP = 3.0 tsf MC = 14.2%
1238.5	36.0	CL	**SANDY LEAN CLAY** trace gravel, trace seams of silt and sand, brown to dark gray, wet, very stiff to hard. (Glacial Till)	21		PP = >4.5 tsf
				22		PP = 4.25 tsf MC = 14.6%
				17		PP = >4.5 tsf
				38		PP = >4.5 tsf MC = 13.3%
				37		PP = >4.5 tsf
				45		PP = >4.5 tsf MC = 14.3%
			Grades to brown below 30 feet.	61		
			Grades to gray below 35 feet.	39		
			End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT: MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: **B-29** LOCATION: See attached sketch. DATE: 1/18/2012 SCALE: 1" = 5'

Elev. 1265.7	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1263.7	2.0	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
		CL	**SANDY LEAN CLAY** trace gravel, grayish brown, wet, rather stiff. (Glacial Till)	9		PP = 3.0 tsf
1259.2	6.5			9		PP = 3.0 tsf MC = 16.7%
		CL	**SANDY LEAN CLAY** trace gravel, trace seams of silt and sand, brown to dark gray, wet, very stiff to hard. (Glacial Till)	20		
				22		PP = >4.5 tsf MC = 14.7%
				30	▽	Water encountered around 12.5' PP = >4.5 tsf
				53		PP = >4.5 tsf
			Grades to brown below 20 feet.	51		PP = >4.5 tsf MC = 10.4%
1239.7	26.0			50		PP = >4.5 tsf
			End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT:	MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: **B-30**
		LOCATION: See attached sketch.
		DATE: 1/18/2012 SCALE: 1" = 5'

Elev. 1254.2	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1252.2	2.0	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
1247.7	6.5	CL	**SANDY LEAN CLAY** grayish brown, wet, medium. (Glacial Till)	6		PP = 1.75 tsf MC = 18.1%
				8		No sample recovered.
1243.2	11.0	CL	**SANDY LEAN CLAY** trace gravel, brown to dark gray, wet, very stiff. (Glacial Till)	21		PP = >4.5 tsf
				24		PP = >4.5 tsf MC = 15.3%
			End of Boring. Boring sealed upon completion.			

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT: MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: **B-31** LOCATION: See attached sketch. DATE: 1/18/2012 SCALE: 1" = 5'

Elev. 1256.3	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1255.1	1.2	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
1252.3	4.0	SM	**SILTY SAND** fine-grained, trace seams of clay, brown, moist, medium dense. (Glacial Outwash)	11		
1249.8	6.5	CL	**SANDY LEAN CLAY** grayish brown, wet, medium. (Glacial Till)	6		PP = 1.0 tsf MC = 18.7%
1245.3	11.0	CL	**SANDY LEAN CLAY** trace gravel, brown to dark gray, wet, very stiff. (Glacial Till)	17 18		PP = >4.5 tsf MC = 15.7% PP = >4.5 tsf
			End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12

LOG OF BORING

CHOSEN VALLEY TESTING

CVT

PROJECT:	MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: B-32 LOCATION: See attached sketch.
		DATE: 1/18/2012 SCALE: 1" = 5'

Elev. 1269.4	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1268.2	1.2	CL OL	**Slightly Organic LEAN CLAY** black. (Topsoil)			
		CL	**SANDY LEAN CLAY** grayish brown, wet, rather stiff to stiff. (Glacial Till)	10		PP = 3.0 tsf
				13		PP = 2.25 tsf MC = 15.4%
1262.9	6.5	CL	**SANDY LEAN CLAY** trace gravel, brown to dark gray, wet, rather stiff to very stiff. (Glacial Till)	12		PP = >4.5 tsf MC = 10.4%
				22		PP = >4.5 tsf
1258.4	11.0		End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12

LOG OF BORING

CHOSEN VALLEY TESTING **CVT**

PROJECT: MNR12.3900 Design Phase Geotechnical Evaluation Stewartville Development Schumann Drive NW Stewartville, Minnesota	BORING: **B-33** LOCATION: See attached sketch. DATE: 1/18/2012 SCALE: 1" = 5'

Elev. 1273.0	Depth 0.0	USCS Symbol	Description of Materials (ASTM D 2487/2488)	BPF	WL	Tests and Notes
1271.5	1.5	CL OL	**Slightly Organic LEAN CLAY** black, wet. (Topsoil)			
1269.0	4.0	CL	**SANDY LEAN CLAY** grayish brown, wet, medium. (Glacial Till)	7		PP = 3.0 tsf MC = 11.2%
1262.0	11.0	CL	**SANDY LEAN CLAY** trace gravel, brown to dark gray, wet, very stiff. (Glacial Till)	22		Poor sample return.
				24		PP = >4.5 tsf MC = 16.8%
				23		PP = >4.5 tsf
			End of Boring. Boring sealed upon completion.			

CVT STANDARD MNR12.3900 (STEWARTVILLE DEVELOPMENT).GPJ LOG A GNNN06.GDT 1/30/12